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ABSTRACT

This report includes papers from a 1998 symposium to promote the professional sharing of current educational issues. The papers are: "A Tapestry of Authors" (Maurine Richardson and Margaret Miller); "Critical Thinking Strategies Across the Curriculum" (Constance L. Hoag and Sharon Andrews); "The Effect of Journal Writing on Teachers' Theory Development" (Lana Danielson); "School Subject Teaching Preferences Held by Elementary Teachers" (Robert W. Wood and Lynne Roach); "Attribution Studies of Children with Learning Disabilities" (Mary Ring); "An In-Depth Look at South Dakota's Successful Early Childhood Inclusion Program" (Geralyn Jacobs, Dot Stoll, Joanne Wounded Head, Kristy Spencer, and Gui-Ping Zhang); "The Impact of Perinatal Insults and Disabilities on Development from Birth to Eight Years of Age: Research Linked to Practice" (Marilyn Urquhart and Patricia Work); and "Writing and Computers: Increasing Geometric Content Based Knowledge Using the Van Hiele Model" (Roger Parsons, Jack Breen, and Robert Stack). (SM)

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RESEARCH, ISSUES, AND PRACTICES

Sixth Annual
Curriculum and Instruction
Research Symposium
Conference Proceedings
University of South Dakota
Vermillion, South Dakota

April 24, 1998

Delzell Education Center

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SYMPOSIUM PREFACE

The Curriculum and Instruction Research Symposium was conducted on April 24, 1998 to promote the professional sharing of current educational issues. Other goals of this symposium included providing a forum for dialogue concerning relevant educational topics, and the sharing of faculty research interests.

This symposium report contains a myriad of educational issues, topics, and research, and is the written report reflecting the oral presentations. We believe the publication of this document will continue to serve as a forum to encourage professional dialogue and as an acknowledgement of current, relevant research in the field of education.

We gratefully acknowledge the financial support received from the School of Education to help defray the cost of the symposium events.

Robert W. Wood
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Division of Curriculum and Instruction
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April, 1999

A TAPESTRY OF AUTHORS

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INTRODUCTION

Considering the role that literature is playing in today's classroom, it can not be relegated to the supplementary shelves. A good book should be placed right beside the textbook as a resource for learning and developing skills and concepts (Oden, 1995). Using literature as part of the primary reading material motivates learners to become more active and involved in their learning (Smith & Johnson, 1995). Research by Calfee (1987) states that trade books provide students with the opportunity to see causal relationships between concepts and to answer their questions through reading. Textbooks may not provide sufficient depth of content to allow students to construct and comprehend events or phenomena, nor provide adequate explanations for promoting connections among the sequence of ideas according to Beck and McKeown (1991).

Students prefer literary works with subject matter that relate to their personal experiences. They interact more with such literary works and actively seek them out (Harris, 1990). According to McMillan and Gentile (1988) literature promotes interest and involvement, as well as, provides students with positive experiences. Sewall (1988) states that narrative history can provide adventure and excitement that students enjoy.

There are four reasons why literary works need to be part of the curriculum: 1) stories give students clues as to how they should react emotionally to historical events and the people involved in them; 2) reality is more easily understood through literary works, 3) literary works have an end and are more satisfying, and 4) provides a shared experience for the teacher and students and a place to start the literary work (Common, 1986). Literature provides an array of human experiences, feelings, and emotions (Shumaker & Shumaker, 1988).

Adding literature to the curriculum can add depth to the content under study which will permit a broader investigation by students and the teacher and at the same time allow the examination of an issue from a variety of perspectives, integrate information from diverse sources and to build upon their interests (Smith & Johnson, 1995).

Books provide a wide range of information. as well as, share multiple perspectives on the human experience. In addition, they can allow readers to engage in dialogue with any literature in the world (Pugh, Garcia, & Margalef-Boada, 1994). Students have a huge interest in the world around them (Fitzhugh, 1993). The United States is not longer a melting pot, but a salad bowl, where each person can retain his/her own uniqueness culturally (Mattson & Richardson, 1992). In a truly inclusive community, no one is exclusive or excluded (England, 1992). It has been found that people are less threatened by other cultures if they truly understand their own culture (Mattson & Richardson, 1992). Rather than viewing cultural differences as hurdles, educators should accept the richness that diversity offers (Skeleton, 1991).

Clarke (1990) states that literature can humanize distant locations, events and captures the imagination. Literary works such as novels can transport the reader to settings both past and present. These books can contain examples of cultural and physical landscapes that can create mental images of spatial organization (Lamme, 1987). According to Levstik (1985) good fiction or nonfiction literature can capture the reader's interest through the characters and the places associated with the characters.

In conclusion, literature either in the genre of historical or contemporary realistic fiction, can bring to the student a more meaningful and detailed understanding of what life is like in another time or place, by turning dry factual information into a story. A story is a natural vehicle for enhancing learning because it makes the information real to children.

This research project was developed as a result of the investigators being asked by educators "Are there books written by authors about the state they live in?" The question that has been asked of the investigators and knowing that children and adults love to read about their home states, as well as other areas of our country served as the bases for this research project. The following research question was investigated:
1. What authors write/wrote literature using their home state or state in which they live(d) as the setting for their literary works?

The research has revealed a list entirely to long for this paper. The investigators limited the research to the following question:

2. What authors use their home states in the upper Midwest as the setting

for their literary works? (Iowa, Kansas, Minnesota, Montana, Nebraska, North Dakota, and Wyoming)

This bibliography is a result of research. Although many books are available about each state, only a few are written by authors who live or have lived in the state they are writing about. The following books are a sample of mainly fiction books with stories that take place in a certain state; some are historical fiction, other are contemporary realistic fiction, and the few remaining are non-fiction.

Iowa

Hall, Lynn. (1989). Dagmar Schultz and the Angel Edna. Charles Scribner's Sons. Grades 5-7.

Hall, Lynn. (1991). Dagmar Schultz and the Green-eyed Monster. Charles Scribner's Sons. Grades 5-7.

Holl, Kristi D. (1973). The Haunting of Cabin 13. Athenaeum. Grades 3-6.

Holl, Kristi, D. (1989). Hidden in the Fog. Athenaeum. Grades 5-7.

Kansas

Brown, Irene Bennett. (1982). Before the Lark. Athenaeum. Grades 4-8.

Martin, Bill Jr. and Archambault, John. Ghost-eyed Tree. Henry Holt. Grades K-3.

Martin, Bill Jr. and Archambault, John. Merry Months of Birds. DLM Grades K-5.

Minnesota

Bauer, Marion Dane. (1991). Face to Face. Clarion. Grades 5-8.

Paulson, Gary. (1996). Puppies, Dogs, and Blue Northerns: Reflections on Being Raised by A Pack of Sled Dogs. Harcourt Brace & Co. Grades 4-8.

Paulson, Gary. (1994). Father Water, Mother Woods: Essays on Fishing and Hunting in the North Woods. Delacorte Press. Grades 6-12.

Paulson, Gary. (1991). The Cookcamp. Orchard. Grades 5-8.

Paulson, Gary. Popcorn Days and Buttermilk Nights. Lodestar. Grades 6- 9.

Wood, Douglas. (1995). Minnesota, the Spirit of the Land. Voyageur Press.

Adult.

Wood, Douglas. (1992). Old Turtle. Pfeifer-Hamilton. Grades 3-8.

Wood, Douglas. (1996). The Windigo's Return: A North Woods Story. Simon & Schuster. Grades 3-8.

Montana

Corcoran, Barbara. (1986) A Horse Named Sky. Athenaeum. Grades 6-8.

Corcoran, Barbara. (1969). Sasha, My Friend. Athenaeum. Grades 6-8.

Patent, Dorothy Hinshaw. (1991). A Family Goes Hunting. Clarion Books. Grades 3-7.

Patent, Dorothy Hinshaw. (1991). Where the Bald Eagles Gather. Clarion Books. Grades 3-6.

Nebraska

Cather, Willa. (1988). Alexander's Bridge. Dutton. Grades 6-12.

Cather, Willa. (1954). My Antonia. Houghton. Grades 6-Adult.

Cather, Willa. (1913). O Pioneers! Houghton Mifflin. Grades 6-Adult.

Sandoz, Mari. (1954). The Horsecatcher. Westminster Press. Grades 7- Adult.

North Dakota

Rolfsrud, Erling N. (1985). Cutbank Girl. Lantern Books. Grades 4-12.

Rolfsrud, Erling N. (1985). Girl of the Tumbleweeds. Lantern Books. Grades 4-8

Rolfsrud, Erling N. (1984). Gopher Tails for Papa. Lantern Books. Grades 4-6.

Sypher, Lucy Johnston. (1974). Cousins and Circuses. Athenaeum. Grades 5-8.

Sypher, Lucy Johnston. (1972). The Edge of Nowhere. Athenaeum. Grades 5-8.

Sypher, Lucy Johnston. (1974). The Spell of the Northern Lights. Athenaeum. Grades 5-8.

Sypher, Lucy Johnston. (1976). The Turnabout Year. Athenaeum. Grades 5-8.

South Dakota

Rounds, Glen. (1960). The Blind Colt. Holiday House. Grades 3-5.

Rounds, Glen. Cowboys. (1991). Holiday House. Grades K-2.

Sneve, Virginia Driving Hawk. (1972). High Elk's Treasure. Holiday House. Grades 4-6.

Sneve, Virginia Driving Hawk. (1972). Jimmy Yellow Hawk. Holiday House. Grades 2-5

Sneve, Virginia Driving Hawk. (1974). When Thunders Spoke. Holiday House. Grades 4-8.

Veglahn, Nancy. Follow the Golden Goose. Addison Wesley. Grades 5-12.

Wilder, Laura Ingalls. (1961). By the Shores of Silver Lake. HarperCollins. Grades 4-8. (Newbery Honor Book).

Wilder, Laura Ingalls. (1953). Little Town on the Prairie. HarperCollins. Grades 4-8. (Newbery Honor Book).

Wilder, Laura Ingalls. (1953). The Long Winter. HarperCollins. Grades 4-8. (Newbery Honor Book).

Wilder, Laura Ingalls. (1961). These Happy Golden Years. HarperCollins. 1961. Grades 5-12. (Newbery Honor Book).

Wilder, Laura Ingalls. (1971). The First Four Years. Harper Collins.Grades 5-12.

Wyoming

Blanc, Esther Silverstein. (1989). Berchick. Volcano Press. Grades 2-4.

Gregory, Kristiana. (1989). Jenny of the Tetons. Harcourt Brace Jovanovich. Grades 6-8.

O'Hara, Mary. (1988). My Friend Flicka. Harper Collins. Grades 5-8.

O'Hara, Mary. (1946). Green Grass of Wyoming. Lippincott. Grades 8-12.

O'Hara, Mary. (1943). Thunderhead. Lippincott. Grades 5-12.

O'Hara, Mary. (1963). Wyoming Summer. Doubleday. Grades 8-12.

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Beck, I. L. & McKeown, M. G. (1991). Social studies texts are hard to understand: Mediating some of the difficulties. Language Arts 68: 482-490.

Calfee, R. C. (1987). The role of text structure in acquiring knowledge. Final Report to the U.S. Department of Education (Federal Program No. 122b). Palo Alto, CA.: Stanford University, Text Analysis Project.

Clarke, G. (1990). A proposal to revise the elementary social studies curriculum. ERIC Document Reproduction Service No. ED 318 661.

Common, K. L. (1986) Students, stories and the social studies. The Social Studies. 77(3): 246-248.

England, J. (1992). Building community for the 21st century. ERIC Document Reproduction Service No. EDD CG-92-8).

Fitzhugh, W. P. (1993, January). Geography and reading: An integrated approach to teaching reading skills. ERIC Reproduction Service No. 367 563.

Harris, V. J. (1990). Multiethnic children's literature. In Exploring literature in the classroom: Content and methods, ed. K. D. Wood and A. Moss. Christopher-Gordon, 169-201.

Lamme, A. J. (1987). Geography in children's literature: A Florida study. Journal of Geography. 4(86):160-164.

Levstik, L. (1985). Literary geography and mapping. Social Education. 49(1): 38-43.

Mattson, D. L. & Richardson, M. V. (1992). Salad bowl--All together, all unique, all special. ERIC Reproduction Service No. 349 526.

Oden, P. (1995, July/August). Books, places, regions--A natural blend. Journal of Geography. 94(4): 466-470.

Pugh, S. L., Garcia, J., & Margalef-Boada, S. (1994, March/April).

Multicultural trade books in the social studies classroom. The Social Studies. 85(2):62-65.

Sewall, G. T. (1988). American History textbooks: Where do we go from here? Phi Delta Kappan. 69(8): 553-558.

Shumaker, M. P. & Shumaker, R. C. (1988). 3000 paper cranes: Children's literature for remedial readers. The Reading Teacher. 41(6): 544-549.

Smith, J. L. & Johnson, H. A. (1995, March\April). Dreaming of America: Weaving literature into middle school social studies. The Social Studies. 86(1): 60-68.

Skeleton, S. (1991). Our shrinking world: The need for cultural awareness. Paper presented at the Annual Conference of the Association for Childhood Education International, San Diego, CA. (ERIC Document Reproduction Service No. ED 338 381).

CRITICAL THINKING STRATEGIES ACROSS THE CURRICULUM

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INTRODUCTION

Critical Thinking. What is it? Who does it? Who should do it? How does one do it? What happens when one does it? Does it hurt? Does it help? ... Yes, the idea of critical thinking evokes a multitude of questions, especially when one considers such an attractive phrase in modern educational thought. Just think of it. Is it really possible, or even desirable that we motivate and lead others to think "critically" or to "critically" think? What are the benefits of a population or a society where the citizens are better at this "skill," and conversely, what might be the risks of accepting or contributing to a society that does not engage in this kind of "thought?" If it is agreed that this type of thinking, whatever it really is, should be a stalwart of our modern educational philosophy, there are many other questions to answer such as how should the teaching of such a skill be incorporated as an integral part of the educational environment? Is the teaching of "critical thinking" equally appropriate to all the various disciplines, or is it more apparent and therefore more meaningful in certain areas?

Perhaps the best direction to offer, rather than attempting to answer the myriad of questions about critical thinking, is to pose the realization that far too many in education do not have a clear understanding of the definition of the term "critical thinking." Most educators would say that they are familiar with critical thinking and that we should all strive to develop better "critical thinkers," but the reality is that far too many who are responsible for teaching and administration do not actually understand the term at a substantive and meaningful level. Perhaps an account of the development of the critical thinking concept throughout history will move one toward a greater understanding of the various attributes and thoughts on this important issue.

Throughout ancient history, hundreds of thinkers have contributed to the development of critical thinking, and each major discipline has made some contribution to critical thought. "Socratic Questioning" is probably the best known critical thinking strategy today, which began over 2400 years ago with Socrates and his challenges to justification of claims to knowledge. Through this type of questioning, ideas and information are questioned intensely before they are considered believable. According to Richard Paul (Paul and Binker, et al., 1990), there are six categories of questions:

"questions of clarification, questions that probe assumptions, questions that probe reasons and evidence, questions about viewpoints or perspectives, questions that probe implications and consequences, and questions about the question" (pp. 44-45).

Sometime later, in the fourth and fifth centuries BC, the Greek philosophers Plato, who recorded Socrates' thought, and Aristotle elevated and compared that which only the trained mind notices, and what others perceive. They thought that only the trained mind could see below the delusive appearances. As a result of this point of view, there came the need for a more comprehensive manner of thinking which was securely based on reason while respondent to objections.

The practice of systematic critical thinking, which was established by Greek philosophers, was continued by others during the Middle Ages. For example, Thomas Aquinas (1225-1274) called further attention to the benefits of constant inquisition and questioning, and the importance of reasoning in thought. Further, Aquinas used the results of critical thinking and the aspect of constant criticism as an integral aspect in the evolution and development of his own ideas.

In tracing the developments in critical thinking throughout the ages, the Renaissance included many scholars in all the major disciplines who began to think critically and examine the concept of critical thinking. One English scholar, Francis Bacon understood the shortcomings of the mind's natural thought tendencies. In his work, The Advancement of Learning, Bacon cautioned against learning through only established fact. Rather, he advocated the importance of world experiences in the assimilation of knowledge.

Included in the current century are many other great philosophers and scholars who contributed to critical thinking. In particular, the modern critical thinking movement can be traced back to 1941 to the work of Edward Glaser (Paul, 1993). In his book, An Experiment in the Development of Critical Thinking, Glaser (1985) suggested that critical thinking involves three main elements: "(1) an attitude of being disposed to consider in a thoughtful, perceptive manner the problems and subjects that come within the range of one's experiences; (2) knowledge of the methods of logical inquiry and reasoning; and (3) skill in applying those methods" (p.25). In collaboration with Watson, Glaser developed The Watson-Glaser Critical Thinking Appraisal in 1940 which also contributed to the modern critical thinking movement.

While there are many contributors to the modern critical thinking movement, two of the more notable proponents were Robert Ennis and Harvey Siegel. Ennis defined critical thinking as "rational, reflective thinking concerned with what to do or believe" (cited in Paul, 1993, p.135). This definition emphasizes the impact of critical thinking on everyday life. Siegel defined critical thinking as appropriate thinking influenced by reasons. He believed that forces other than reason (e.g. emotion, desire, rewards, punishment, etc.) often interfere with our thinking (California Commission on Teacher Credentialing, 1997).

One of the more notable recent figures in the area of critical thinking was Beyer (1985) who offered more specific criteria are properties of critical thinking behavior. Specifically, he believes that critical thinking is a collection of discrete skills or operations, each which combines analysis and evaluation to some degree. He has compiled lists of critical thinking skills from other researchers or teams of researchers. This list includes the following which are at the center of critical thinking: "distinguishing between verifiable facts and value claims; determining the reliability of a source; determining the factual accuracy of a statement; distinguishing relevant from irrelevant information, claims, or reasons; detecting bias; identifying unstated assumptions; identifying ambiguous or equivocal claims or arguments; recognizing inconsistencies or fallacies in a line of reasoning; distinguishing between warranted and unwarranted claims; and, determining the strength of an argument" (p.272).

Finally, the work of Richard Paul (1993) offers much more elaboration on the concept of critical thinking and further relates the idea to contem-porary education. Paul believes that we should not put too much weight on one definition of critical thinking because of the complex nature of the concept. In collaboration with A.J.A. Binker and Daniel Weil, Paul wrote, Critical Thinking Handbook: A Guide for Remodeling Lesson Plan in Language Arts, Social Studies, and Science (1990), in which he suggests that there are thirty-five dimensions of critical thinking, including affective and cognitive strategies. In general, Paul (1993) contends that the mind is capable of spontaneous thought, but that it does not naturally think critically or discipline itself in an intellectual manner. He further states that training and intervention are required to cause the mind to think critically.

There is public pressure on schools to demonstrate their worth and such pressure has caused school systems to narrow the focus of evaluation to tangible goals, competency based skills and achievement tests. However, the quality of learning is determined by the quality of the process operations used in learning (Beyer, 1987, p. 25).

Educators (Paul, 1990) believe the evaluation of the quality of education should be found in the context of the processes, the strategies and the methods used by teachers. Research demonstrates that learning can be improved and that scores on standardized achievement tests can be raised if thinking skills are regularly integrated in the classroom. Further, when teachers begin to develop their own thinking and problem solving skills, they are more likely to try new ideas in the classrooms.

PURPOSE OF THE STUDY

The purpose of this study was to determine the critical thinking knowledge base of pre-service teachers and compare that knowledge base with critical thinking and strategy acquisition/growth after two semesters of university classroom instruction and field based classroom experiences. The survey was completed prior to the student teaching semester.

For purposes of this study a strategy is defined as flexible plan that is used consciously, often to improve comprehension. Thinking strategies are mental plans in which a sequence of steps are used to secure information enabling the learner to process and understand tasks (Dole, Brown & Trathen, 1996).

Good {elementary classroom} workers possess many flexible, adaptable, strategies that they use before, during and after studying to increase their comprehension (Bromley, p. 12). The researchers expanded on the Bromley definition to suggest that pre-service teachers should possess many flexible, adaptable strategies that they can use before, during and after teaching to aid elementary students in classroom comprehension and knowledge acquisition.

A six point questionnaire was completed on both a pre-and post-critical thinking survey. Three questions focusing upon (1) Defining critical thinking, (2) Defining problem solving, and (3) Relating critical thinking to Reflective Decision Making are not reported in this paper.

The substance of the questions appropriate to this paper were: (1) What specific strategies are you aware of to use when teaching critical thing or problem solving....?, (2) I remember being in a classroom when the following critical thinking or problem solving strategies were used...., and (3) At the present time I would feel secure using the following critical thinking or problem solving models in my teaching.

RESEARCH PROCEDURES

The population was determined by membership in two elementary education cohorts progressing through the prescribed pre-service program, students in Dr. Hoag's Principles and Practices of Education and Internship (first semester), and Language Arts (second semester). The time period included the spring 1997, fall 1997 and spring 1998 semesters. Cohort I was surveyed in spring 1997 and fall 1997, while Cohort II was surveyed fall 1997 and spring 1998. Cohort I had thirty-three students responding to the pre- and post-test and Cohort II had responses from thirty-one students for a total of sixty-four pre-service teachers.

For purposes of consistency and accuracy in determining the level of critical thinking learning acquisition only, students names were required on the surveys. Students were given the option to participate or not to participate. If students were unable to complete both surveys their responses were appreciated, but not included in the data for this study. Human subjects permission was sought and received.

VARIABLES

There are five variables to be acknowledged when considering the results of this survey:

* On both pre- and post-surveys the pre-service students were responding from memory with no suggested list of strategies. This technique was followed in order to not lead students and to omit rote/echo responses. The researchers believe teaching

requires immediate strategy knowledge.

- * The identification of terms within and throughout the curriculum may not be identical.
- * Last experiences with a particular strategy may be the first recalled.
- * Personification of the pre-service teachers needs or learning style may best recalled.
- * Some of the responses pre-service students gave deviated from the meaning of a teaching strategy as defined by this study. In those cases, the response will not contained in this document.

FINDINGS

All data is based on the results of the posttest. Scores are reported only if in the post test any specific strategy totaled five students or more.

The first reported question focused on specific strategy awareness. See Appendix A for the graphics of the following results. In the pretest three critical thinking/problem solving strategies were recalled: 1) Think-Pair-Share (6 responses), with Brainstorming and Round Table Discussion (5 responses).

After two semesters of class curriculum the pre-service students identified 15 strategies: Think-Pair-Share (30 responses), Brainstorming (24 responses), KWL K=Know-W=Want to know-L=Learned (15 responses), Circle Consensus Response and Round Table Discussion (11 responses). Jigsaw (8 responses), Delving, Inside-Outside Circles and Numbered Heads Together (7 responses), S=Survey, Q=Question, 3R=Read, Recite, Review (6 responses) D=Directed R=Reading T= Thinking A =Activity, Think-Pair-Square, Q=Question, A= Answer R= Responses, Think-Write-Pair-Share and Semantic Webbing (5 responses).

The second reported question asked the pre-service students to recall being in a classroom where specific strategies were used. On the pre-test only one strategy Brainstorming had the designated number of five (5 responses). On the post testThink-Pair-Share (53 responses), Brainstorming (32 responses), K-W-L (25 responses), Semantic Maps/Webbing (15 responses), Circle Consensus Response, Think-Pair-Write, and Round Table Discussion received (12 responses). Delving, Journaling, Venn Diagrams and Think-Pair-Square received (11 responses), with Think Alouds and Character Webs (8 responses) followed by Blooms Taxonomy (7 responses, QAR (6 responses) and DLTA (5 responses). The graphic of this information is found in Appendix B.

The final question reported in this survey asked pre-service teachers which of the critical thinking/problem solving strategies they would feel secure in using in their student teaching classroom. On the pre-test Brainstorming was the only strategy to receive 5 responses. On the post-survey Brainstorming ranked first (42 responses) while Think Pair Share and K-W-L tied for second (23 responses). Journaling and Group Work received (10 responses) and Delving received (9 responses). Circle Consensus Response (8 responses), Think-Pair-Write (7 responses) and Round Table Discussion ranked next (6 responses). The final strategies receiving 5 responses were Venn Diagrams, Bloom's Taxonomy, Semantic Maps/Webbing and Problem Solving. This information can be seen in Appendix C.

CONCLUSIONS

The researchers believe the awareness and recall questions are important issues. For future teachers to recognize critical thinking strategies when a peer or colleague is using a specific model adds to the viewers teaching reporter.

However, we believe the most important results are found in the final reported question. If teachers are to use such models they must feel a strong knowledge base and feel secure when using such strategies in their classroom. The increase of comfort was remarkable from one semester to another, from being comfortable with only one strategy to being comfortable when teaching fifteen strategies. This information implores professors of future teachers to teach, model, demonstrate and allow pre-service students to become familiar and comfortable with a repertoire of teaching strategies.

SUPPLEMENTARY INFORMATION
CRITICAL THINKING THROUGHOUT HISTORY

A. Early Experts on Critical Thinking

I. Socrates (over 2500 years ago)

a. discovered a method of questioning that challenged justification of claims to knowledge.
b. established the importance of asking "deep" questions that probed profoundly into thinking before ideas should be accepted and deemed worthy of belief.
c. "Socratic" questioning is the best known critical thinking teaching strategy. (see list)

II. Greeks - Plato, Aristotle (fourth and fifth centeries B. C.)

a. emphasized that things are often very different from what they appear
b. thought only the trained mind could see below the surface (delusive appearances
c. resulted in systematic thought, comprehensive and well-reasoned thinking that is responsive to objections.

III. Thomas Aquinas (middle ages)

a. incorporated responses to the test of critical thought and criticism as a necessary stage in developing his ideas
b. raised awareness of the power and need for reasoning to be developed and questioned (cross-examined).

IV. Francis Bacon (Renaissance - 15th-16th centuries)

a. recognized that the mind cannot be left to its natural tendencies
b. wrote The Advancement of Learning which argued the importance of studying the world from experience, rather than established facts.

V. Colet, Erasmus, More, Descartes, Machiavelli

VI. 16th and 17th Centuries

Hobbes, Lock, Boyle, Newton, Bayle, Montesquieu, Voltaire, Diderot

VII. 18th Century

Adam Smith, Kant

VIII. 19th Century

Comte, Spencer, Darwin, Freud

IX. Twentieth Century Experts on Critical Thinking

a. John Dewey (1933)

b. Edward Glaser suggested that critical thinking involves three main elements:
    1. an attitude of being disposed to consider in a thoughtful, perceptive manner the problems and subjects that come within the range of one's experiences
    2. knowledge of the methods of logical inquiry and reasoning
    3. skill in applying those methods

c. Robert Ennis (1962) defined critical thinking as "rational, reflective thinking concerned with what to do or believe." His definition calls attention to the wide role that critical thinking plays in everyday life.

d. Harvey Sigel (1980) defined critical thinking as thinking appropriately moved by reasons. Our minds are often inappropriately moved by forces other than reason (e.g.

Fears, emotions, desires, rewards, punishment, etc.).

e. B. Beyer (1985) compiled lists of critical thinking skills from other researchers.
   1. distinguishing between verifiable facts and value claims
   2. determining the reliability of a source
   3. determining the factual accuracy of a statement
   4. distinguishing relevant from irrelevant information, claims, or reasons
   5. detecting bias
   6. identifying unstated assumptions
   7. identifying ambiguous or equivocal claims or arguments
   8. recognizing logical inconsistencies or fallacies in a line of reasoning
   9. distinguishing between warranted and unwarranted claims
   10. determining the strength of an argument. Walker, pp. 17-18.

f. Richard Paul believes critical thinking is very complex. The mind does think spontaneously, but it is not of the nature of the mind to think critically. It takes training and Intervention to get the mind to think critically. It is not normal or common for the human mind to discipline itself intellectually.

   Paul defined critical thinking as:
   1. disciplined, self-directed thinking which exemplifies the perfection's of thinking appropriate to a particular mode or domain of thinking
   2. thinking that displays mastery of intellectual skills and abilities
   3. the art of thinking about your thinking while you are thinking in order to make your thinking better: more clear, more accurate, or more defensible.

Questions to be considered in the study of critical thinking:

1. What is critical thinking?
2. What are the benefits of a population or a society where the citizens are better at this "skill"?
3. What might be the risks of accepting or contributing to a society that does not engage in this type of thought?
4. How should critical thinking be taught?
5. Does the mind naturally think critically, or does it have to be trained to do so?
6. Who should teach critical thinking skills?
7. When should the teaching of critical thinking begin?
8. Is the teaching of critical thinking equally appropriate to all the various disciplines?
9. When teaching critical thinking skills, is the teaching of content sacrificed?
10. How should educators be held accountable for the teaching of critical thinking?
11. Do educators know how to teach critical thinking skills?

The following are examples of Socratic Questioning (from Critical Thinking Handbook: A Guide for Remodeling Lesson Plans in Language Arts, Social Studies, and Science, by Richard Paul, A.J.A. Binker, and Daniel Weil, 1995)

Questions of Clarification

What do you mean by --------?
Could you explain that further?
Why do you say that?

Questions that Probe Assumptions

What are you assuming?
What could we assume instead?
Is it always the case? Why do you think the assumption holds here?

Questions that Probe Reasons, Evidence, and Causes

Is that good evidence for believing that.....?
What do you think the cause is?
What are your reasons for saying that?

Questions About Viewpoints or Perspectives

What is an alternative?
What would someone who disagrees say?
Can/did anyone see this a different way?

Questions that Probe Implications and Consequences

What are you implying by that?
What effect would that have?
If this and this are the case, then what else must be true?

Questions About the Question

Is the question clear? Do we understand it?
Do we all agree that this is the question?
Why is this question important?

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THE EFFECT OF JOURNAL WRITING ON TEACHERS' THEORY DEVELOPMENT

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INTRODUCTION

Writing-to-learn is an active approach to processing information and ideas. It suggests that learning and writing are meaning-making processes that facilitate the learner's ability to discover connections, describe processes, express emerging understanding, raise questions, and find answers (Mayher, et al, 1983). Learning involves making distinctions between different types of information. Schema theory provides an understanding of how prior knowledge is used to comprehend new information. Sometimes their prior knowledge helps learners to assimilate information, that is, it assists them in remembering certain facts. At other times, learners accommodate a new conceptualization. This occurs when learners reconstruct their understanding by interpreting the new information in relation to their prior knowledge (Rumelhart and Norman, 1977). While writing can facilitate assimilation of information through the process of recording new facts, it is especially useful in promoting accommodation in which the shaping and sharpening of this information occurs and new meaning can be constructed.

Britton (1975) described three kinds of writing. The first, called transactional, is writing "to get things done." It is used to inform, to advise, to persuade, or to instruct. In short, it is a means to an end. A second function is called expressive. This is language "close to the self," often a kind of "thinking aloud" on paper. It reflects the writer's immediate thoughts and feelings, it is relaxed and familiar rather than formal, and thus it allows the writer to take risks. According to Britton, it is in this mode that "we frame the tentative first drafts of new ideas...where in times of crisis...we attempt to work our way towards some kind of a resolution" (82). A third category of writing is the poetic. This is language used as an art form and it exists for its own sake.

According to Britton (1975), as a novice the learner relies on the expressive mode; the task and the audience remain close to his or her experience. It is through the expressive mode that the writer is able to move toward the transactional or poetic. As he or she gains expertise, choice of function is possible. The writer is able to express thoughts in different ways, moving away from the intimacy of his or her own thoughts to accommodate communication framed by different contexts and for different audiences.

Research on the use of journals (Mayher et al, 1983; Furwiler, 1987) indicates that expressive writing accommodates a variety of functions and audiences. It might serve as a reporting tool or as a place for examining reactions to an event or experience. It might be written for the self or shared as a written dialogue with others. It can be used to record one's thinking in progress, a means of processing new ideas in relation to what is already known or experienced, to ask questions, synthesize ideas, and evaluate current thoughts about theory and practice. Journals put writers at the center of the learning, allowing them to make decisions about the topic to be explored, the audience for whom they are writing, and the choice of language to represent their understanding. By privileging such choice, connections can be made between personal knowledge or beliefs and new ideas or concepts.

BACKGROUND OF THE STUDY

The Nebraska Prairie Visions Summer Institute, which began in 1987, was designed to provide training to K-12 educators in Nebraska on the implementation of discipline-based art education (DBAE). Art specialists, classroom teachers, and administrators attended the Institute as school teams. The focus of the first week, located at the Joslyn Art Museum in Omaha, is DBAE theory. The second week teams meet in four smaller regional groups (Omaha, Lincoln, Kearney, and Scottsbluff) to focus on implementation of DBAE in classroom practice. A third week allows participants to write DBAE unit plans at their individual school sites.

In planning the 1994 Nebraska Prairie Visions Summer Institute, it was decided that writing would be central to the instruction for and evaluation of learning about discipline-based art education. Writing prompts were devised to assist the participants in reflecting on what they had learned, how they were feeling about the day's experiences, and how they were integrating new knowledge into their own beliefs about art education. Team leaders were introduced to theory that supports writing-to-learn, the purpose of the writing segment of the Institute, and strategies (e.g., providing written feedback, modeling reflective questions, leading small group discussion on the previous day's writing) for facilitating the writing task in their small groups.

In 1995 it was decided that data would be gathered to document the participants' conceptualization of DBAE theory as indicated in their journal writing. The segment of the study reported in this article was conducted during the first week of the 1995 Institute and involved 111 Level 1 participants. Journal writing time was scheduled each afternoon of the Institute as a form of debriefing and discussion time was scheduled prior to the formal lecture or activities the following morning. The Day 1 prompt was "Describe your experience in touring the Joslyn Galleries. What surprised you? What left you in awe or made you comfortable? What gallery or work are you eager to revisit? Why?" On succeeding days the following writing prompts were provided. "Today's activities...

- created tensions in my thinking with regard to ____ because....
- reinforced my thinking about ____ because ....
- fostered an awareness about my current practice because ....
- raised the following questions in my mind ....
- made me reconsider my belief about ____ because ....
- left me in need of more information about ....
- related to previous learning in which ....
- offered a meaningful application to my current practice by ...."

Two research questions guided this study: (1) How does journal writing facilitate the participant's growth in conceptualizing the DBAE theory? and (2) How does journal writing provide a vehicle for implementing DBAE into classroom practice?

To facilitate the data collection process, each participant was provided with color-coded NCR paper that listed specific writing prompts and space for daily responses. They were asked to select a personal code (e.g., initials, numerals, a logo) to designate their journal entries as a means of providing anonymity as well as a sorting mechanism when data were grouped for analysis.

SCORING PROTOCOLS

To analyze the data a basic protocol was designed to assess the participants' growth in conceptualizing the DBAE theory and implementing it into classroom practice. The protocol was based on research on reflective decision-making (Danielson, 1992), theory building (Lee, 1987), and stages of concern and levels of use of an innovation (Fuller, 1969; Hall & Loucks,1977, 1979).

Danielson (1992) examined what informed the decisions novice teachers made about their teaching. Four stages characterized their decisions. At the technological level, novice teachers relied on an external authority such as theory presented in methods classes, their field-based supervisor, or the textbook. At the situational level, novice teachers responded to the context, relying on their perceptions of what had occurred or what they anticipated would occur based on the specific event. At the deliberate level, novice teachers recognized a dilemma or tension that prompted them to ask questions and to seek other sources of information beyond the context. At the dialectical level, novice teachers moved beyond the deliberate mode to transform their thinking and their teaching behaviors.

Lee (1987) identified five aspects of theory building. Teachers consider their own practice, reflect on what they do, engage in risk-taking, conduct action research to learn more about their practice, and thus internalize theory.

Fuller (1969) and Hall and Loucks (1977; 1979) examined teachers' stages of concern as they encounter change and the levels of use that characterize the implementation of innovations. The stages of concern include awareness (little concern about or involvement with the innovation); informational (a general awareness and interest in learning more about the innovation); personal (uncertainty about the demands of the innovation and personal adequacy to meet them); management (focus on processes and tasks of using the innovation effectively); consequence (focus on impact of innovation on students and how to evaluate learning outcomes); collaboration (focus on coordination and cooperation in using innovation); refocusing (exploration of more universal benefits or applications of the innovation).

Fuller also identified seven levels of use: the non-use level (user has little or no knowledge of innovation); orientation (user has recently acquired information about he innovation); preparation (user is preparing for first use of the innovation); mechanical (user focuses most effort on short term, superficial use with little reflection on implications of the theory in their practice); routine (user has stabilized innovation with few changes and little thought given to preparation or improvement of activity); refinement (user varies the use of the innovation to increase impact on students); integration (user combines own efforts to use innovation with related activities of colleagues); renewal (user reevaluates quality of use of innovation to achieve increased impact on students, examines current research, and explores new goals).

Based on these models and an initial reading of the data, a simplified protocol was designed. Four basic stages were identified: Stage 1: Perfunctory (participant offered general summary response to the day's events); Stage 2: Self (participant indicated personalized orientation to theory and interest in learning more); Stage 3: Deliberate (participant focused on process and tasks related to theory but at a superficial or literal level);and Stage 4: Dialectical (participant indicated transfer of theory into practice with risk-taking, appropriate new applications, and refinement of initial learning). Each journal entry was coded according to one of the four stages and entered on a scoring sheet to provide a pattern of reflection for individual participants as well as for the group over the week. For the purposes of this study, only the pattern for the group is reported. (NR = No response.) The scoring protocol with anchor responses from participants' journals is provided in Appendix A.

FINDINGS

Data indicate that a majority of the Level I participants reflected on their learning at Stage 2 or summary writing during most of the first week of the Institute. A significant number, however, were contemplating what they were learning at Stage 3 and this number increased on Day 6 when participants synthesized their learning experiences. However, a substantial number of participants' entries were assessed as "perfunctory" and a significant number did not submit entries. Table 1 summarizes the data.

Table 1. Results of 1995 Week 1 - Level 1 Data (N = 111)

Stage	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1	32	12	7	15	17	9
2	65	54	54	39	39	31
3	0	36	34	34	31	42
4	0	2	2	1	2	1
Total Responses	97	104	97	89	89	83
NR	14	7	14	22	22	28

Note: Stage 1 = Perfunctory
Stage 2 = Self
Stage 3 = Deliberate
Stage 4 = Dialectical

DISCUSSION

The initial purpose in providing opportunities to write about the experiences in the Prairie Visions Summer Institute was to foster learning. It was believed that writing might shape and sharpen the participants' thinking about DBAE and provide a vehicle for a deeper conceptualization of the theory and its implications in their classroom practice. Writing prompts were developed to encourage participants to think about their experiences each day and to provide a choice that matched their personal comfort in articulating what they were learning or feeling. Faculty were inserviced on the purpose of the writing and time was formally provided in the schedule to validate its importance.

There are several possible reasons for the preponderance of Stage 1 and 2 responses and the resulting smaller number of participants responding at Stage 3 and 4. The nature of the writing prompts might be a factor. Perhaps the writing prompts inadvertently invited responses related to how the activities could be used in the participants' classroom rather than on how the theory/conceptual learning behind the activities could be used. Perhaps the number of reflections at Stage 1 could be diminished by eliminating prompts that invite summary writing. If, however, Week 1 is primarily for learning and processing theory at a personal level, participants' response at Stage 2 or Stage 3 is appropriate. During Week 2 when the goal is to transfer the theory into classroom practice, a concerted effort could be made to foster reflection at Stage 3 and Stage 4.

Although time for reflective writing and dialogue was formally part of the schedule, actual use of the time might have been undermined. Late arrivals in the morning, early departures at the end of a full day, preferences for writing in one's own environment, and sessions that ran overtime at the end of a day all likely contributed to a casual regard (disregard) or perfunctory use of writing to facilitate thinking and learning. Discussion in the small groups prior to writing might foster greater understanding that the purpose of an activity is to facilitate meaningful learning of a concept and the routine appropriation of a "fun" or "neat" activity should be analyzed in terms of more sophisticated rationale for its use. Perhaps time for reflection needs to be during the day or tied to the break to encourage group processing and to validate the importance of formal debriefing tasks such as discussion and journal writing.

Faculty may need additional inservice on how to facilitate higher levels of reflection. Discussions with participants about the purpose of the writing and delving into their responses on why they enjoyed an activity and how it might be transferred into their practice should be encouraged. In some cases faculty might equate the amount of writing or speaking with the depth of thought; their own level of conceptualization of what it means to build theory and implement it into meaningful practice might be underdeveloped. Understanding what it means to internalize theory might foster a greater investment in facilitating writing, speaking, and thus thinking about DBAE. Reading the journal entries with increased purpose and then using them to initiate dialogue among participants might encourage a greater degree of reflection.

Although the number of no responses (NR) might indicate absences, it is more likely that the writing tasks were not highly valued by the faculty member or some participants and that, as a result, a lack of sufficient monitoring condoned non-completion of the journal entries. Research (Britton, 1975; Danielson, 1992; Fuller, 1969; Hall & Loucks,1977, 1979; and Lee, 1987) indicates the importance of social interaction in theory building. The writing tasks have largely been a solitary activity, not so much by design as by convenience. If the reflective writing could be combined with group discussions, a higher level of conceptualization of the theory might result. Faculty should demonstrate the kind of thinking that contributes to growth by modeling how to move from summary (Stage 1) and personalized orientations (Stage 2) to meaningful applications (Stage 3 and Stage 4). Additional inservice may be needed for faculty to develop this skill.

The scoring protocols were based on what the researcher perceived to be the goals of Week I. Perhaps an expectation to move beyond Stage 2 in Week I is premature. Goals for participants' growth in their conceptualization of DBAE might be unrealistic given the intensity of the Institution and the time in which participants can process a new knowledge base.

Some participants were more favorably disposed to reflect on their practice, as was indicated by their writing at Stage 3 and Stage 4. The code sheets indicate a horizontal pattern of the writing; that is, we could analyze individual participants to document the pattern of thinking throughout his or her participation. The data from the 1995 Institute provides coding for 111 participants during Week 1. Case studies of selected individuals might offer another perspective on how learners process information and integrate it into their theory base.

Perhaps analysis of the development and completion of unit plans during Weeks 2 and 3 would provide additional information on how the participants have conceptualized DBAE theory. Of particular importance would be the appropriate selection of activities to facilitate the desired learning outcomes. A strong pattern in the data was the description of an activity as "fun" or "neat" without elaboration on how it contributes to meaningful learning. Too often an activity is cast as the learning rather than a means for facilitating the learning. As part of the unit plan, participants should be required to articulate the desired learning, a meaningful rationale for why an activity has been used (especially if it has been appropriated from the Institute), how the activity will support the learning of specific concepts, and how the task will be evaluated in terms of the stated objective.

Finally, a word of caution. The writing episodes are one data source. For some of the participants writing is uncomfortable; for others it might have been supplementary to their group interactions; still others might have done there processing with other participants through discussions outside the formal schedule Prairie Visions. Writing is only one vehicle for processing and demonstrating one's thinking.

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APPENDIX A: Scoring Protocol for 1995 Level 1 Participants' Data

Stage 1: Perfunctory

- Perfunctory response/summary of daily activities
- Minimal personal involvement indicated

I did not have the opportunity to tour the Joslyn Galleries but am looking forward to doing so. I was surprised by the large staff and number of professionals involved in Prairie Visions. I was impressed by the fountain area and mosaics.

The focus of today's program seemed directed at the question "What is art?" Is it spontaneous? Is it original? Is it realistic? Is reproduction? How do we value it?

Stage 2: Self

- Personalized orientation to theory
- Interest in learning more

I enjoyed Michael Gillespie's session on "Is It Art?" However, I felt uneasy at first in analyzing different pieces as to whether or not they could be labeled art. My uneasiness was due to not having been involved with teaching art or having taken an art class for a number of years....Joanne Sowell's session was very informative. It made me reconsider what I view as art. I do tend to value pieces from our Western culture. I hope this week to broaden my view of art....Today I gained more of an appreciation for James Rosenquist and other abstract artists. I see them more as pictorial authors with a message to relate. I still want to know the artist's interpretation to know if I am correct. I'll have to work on that!

Stage 3: Deliberate

- Increased attention focused on process and tasks related to theory
- Routine/mechanical use of activities as learned in session

- Relevance to students indicated but at literal level

I think the more I learn this week, the more questions I will have. The Art/Non Art discussion really challenges a person to do some analyzing in an area where there aren't many concrete answers. This discussion and the following activities help me realize the importance of fostering similar discussions [in my classroom] and that students need to do some decision making in this area....I need more information about women artists and their contributions so that I can present more of a whole picture. Today's activities illustrate how great the need is to have subjects/curriculum integrated. Many times today and during the week we've tried to remember significant events were happening at the time of the art work in certain cultures or parts of the world. It is brilliantly clear how interconnected art is with history and culture as well as many other things. I truly believe art is a fundamental element in a child's education and in our world as a whole and it needs to no longer be considered an "extra." Art provides an avenue to allow our children to do some critical and creative thinking.

Stage 4: Dialectical

- Consideration of impact on students' meaningful learning
- Transfer of learning to appropriate, new applications
- Risk-taking to take theory beyond initial learning
- Refinement and integration of initial learning to own practice

We had some deep conversations in considering why works of art were good or not and the activities in deciding on works of art to buy were excellent awareness and learning experiences... The experience of art, no matter how much we theorize about it, has to do with personal experience and intimately felt connections. I really believe that as we implement the DBAE approach we [need] to remember this thought. As with any area of education, I feel we need to let children discover as much information as possible and that we need to guide them to think critically and help expand their ideas, but I don't feel we should make their decisions for them. Children can learn about art through time and its reflection and impact on society, other cultures, the formal elements, how to appreciate it, how to view art as they develop critical thinking skills and foster creativity.

Today's activities raised the following questions in my mind: How will teachers present multicultural lessons that reflect sensitivity and respect for the group they are addressing? These isolated lessons need to be integrated to a universal experience. These diverse cultures do not exist in a void; they need to be interrelated to other cultures. I personally experience this around Christmas season when teachers want to present a "multicultural" lesson using the Jewish holiday, Hanukkah. They lack an understanding of the religion and culture and think they can present a global perspective in one lesson on a minor holiday. They fail to achieve their outcome and lack an understanding of the reasons why. Holidays are used too much as departure points . Today's activities prompt the rethinking of how we select what we will teach and what messages we are sending covertly and overtly by what we address and what we choose not to address.

SCHOOL SUBJECT TEACHING PREFERENCES HELD BY ELEMENTARY TEACHERS

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INTRODUCTION

A teacher's interest in what they teach helps to carry them through the various teaching processes required of them in the elementary schools. If they find satisfaction in the teaching g process, interest and enjoyment in teaching remains high. The converse of the generalization seems to be apparent in many cases.

There have been studies in South Dakota to identify how children feel about the school subjects they study. Studies by Wood (1978) and Eicher, Wood, Webster, and Gullickson (1988) have dealt with school subjects preferred by elementary school children in South Dakota. In studies dealing with South Dakota, teacher's preferred subjects that have not been conducted. This study was designed to determine the elementary school subjects teachers prefer to teach.

PURPOSE OF THE STUDY

The purpose of this study was to survey elementary school teachers in the rural state of South Dakota with regard to the school subjects they prefer to teach. This study invested (1) the subject preferences of elementary school teachers teaching in grades one through sex in selected South Dakota elementary schools; and, (2) to identify the school subjects who would be the favorite and least favorite to teach.

NEED FOR THE STUDY

In order to improve the elementary schools it is important to determine and analyze the school subjects which elementary school teachers prefer to teach. A result of this process should be the development of appropriate in-service and in-service educational experiences that would equip elementary teachers to be highly motivated and competent to teach all school subjects typically taught in an elementary school.

THE METHOD

In order to select participants for the research, 100 elementary schools with grades 1-6, were randomly selected by using a table of random numbers. Two hundred teachers from the 100 elementary schools were mailed the survey instrument with an accompanying letter. In order to have a balance of teachers across grades 1-6, the first questionnaire was sent to a first grade teacher, the second questionnaire to a second grades teacher, up through grade six. The sequence started over again until 200 teachers were identified. The outside of the envelope indicated the teachers in appropriate grade level. Participation was voluntary, and of the 200 elementary teachers mailed the questionnaire, 124, or 62 percent of those contacted, participated in the research by completing and returning the survey.

A six-item survey was designed to solicit information about the teachers and their perceptions about typical school subjects, which are taught in the elementary school. Three major questions dealt with school subjects. A listing of thirteen school subjects including mathematics, art, practical/creative writing, handwriting, health, music, reading, science, social studies, spelling, physical education, listening, and oral expression were listed. Following the subjects were some descriptive words. If they liked teaching the subject the circled the word like. M If they disliked teaching the subject, they circled dislike, and if they neither liked nor disliked teaching the subject, the circled the words, neither liked nor disliked.

Another questioned asked the teachers to identify one school subject that was their favorite to teach. Teachers fill in the subject in the blank space provided. The last question asked the teachers to identify the one school subject that was their least favorite to teach.

DEMOGRAPHIC INFORMATION

Of the teachers responding, 85 percent were female and 15 percent male. There was an attempt to have a balance of grade levels represented in this study. This balance was achieved with 18 percent of the teachers being first grade teachers, 20 percent on the second grade level, 17 percent in third grade, 15 percent teaching fourth grade, 19 percent on the fifth grade level, and 10 percent teaching sixth grade.

There was a mix of years of teaching experience for the respondents 10 percent had 1-5 years of experience, 13 percent from 6-10 years of teaching, 16 percent from 11-15 years, 21 percent with 16-20 years of teaching, 14 percent 21`-25 years of teaching, 15 percent with 26-30 years of teaching experience, 5 percent with 31-35 years of teaching, 6 percent with 36-40 years teaching experience, and 1 percent of over 40 years in the teaching profession.

Based on the demographic information, the researchers believe the sample of teachers completing this teacher preference survey questionnaire are representative of elementary teachers in the state of South Dakota.

FINDINGS

The first survey item asked the elementary teachers to circle like, dislike, or neither like nor dislike for thirteen commonly taught elementary school subjects. In order to determine a mean value for each subject so a rank order of subjects could be made, a value of 1 was given for neither like nor dislike, a value of 2 assigned to dislike, and the value of 3 for like.

Mathematics was the highest ranked elementary school subject in terms of liking to teach. Reading was a close second, with spelling, science, social studies, creative writing, oral expression, art, health, listening, handwriting, music, and physical education following. Table 2 summarizes the data for this question.

The second question on the questionnaire asked teachers to identify one school subject that was their favorite to teach. A blank space was provided. Thirty-nine percent of the teachers identified mathematics as their favorite subject to teaches. Reading was identified by 21 percent as their favorite, followed by science at 15 percent, social studies 13 percent, English 5 percent, and art and creative writing each received 2 percent. S numbers of other subjects were identified and were classified as miscellaneous at 3 percent. Table 2 summarizes the data from this question.

The final question asked teachers to identify one school subject that was their least favorite to teach. Twenty percent identify science as their least favorite subject to teach. Creative writing was the second least subject with 15 percent of the teaching making this response. Handwriting followed with a 12 percent rating. The other typical school subjects received percentage responses ranging from two to 8 percent. See Table 3 for summary.

DISCUSSION

Analysis of the data indicated a great deal of consistency when reviewing the Information presented in Tables 1-3. Mathematics is the favorite subject in school to teach, as shown in Tables 1 and 2. Mathematics received one of the lowest percentage response rates as being the least favorite subject taught in the elementary schools. Questions can now be raised about the reasons for mathematics being the most favorite subject to teach. Is it because of the many hands-on manipulative that are available? Is it because of the long-standing NCTM standards that have been taught in undergraduate programs and in-service workshops? Another research study could determine the reasons.

It does not come as a surprise that reading is the second most favorite subject taught by elementary school teachers. Reading has always been heavily emphasized in elementary schools and there are several national movements to encourage the teaching of reading. Reading has been a high priority of elementary schools for decades.

Spelling was ranked high on Table 1 but was never mentioned as a favorite subject as reported in Table 2. It was identified as one of the least favorite subjects in Table 3 but at a low percentage rate. There is not a consistent pattern with spelling.

Science was ranked high in Table 1 and Table 2 as being a fairly favorite subject to teach. However, it also received the highest percentage (20 percent) of lest favorite subjects taught. Science can be taught with many hands-on experiments using a wide variety of materials, which some teachers might view as making it easier to teach. Or, it might be viewed as somewhat difficult because of the time it takes to use the materials. Whatever the reasons, science is viewed as being a favorite subject to teach and also as a least favorite subject to teach.

Coming as a surprise to the investigators was the subject social studies. It was ranked fairly high in Tables 1 and 2 and had a low percentage in the least favorite subjects to teach. In past research studies conducted by (Wood, 1978) and (Eicher, Wood, Webster, and Gullickson, 1988) social studies was one of the least favorite subject of elementary school students.

In reviewing the data summarized in Tables 1, and 2, most of the elementary school subjects appear to be liked in terms of teaching. Only music and physical education received low means as shown in Table 1. Neither is noted in Table 2. They are listed as being some of the least favorite subjects to teach but with low percentage numbers. One reason for the low rankings might be that special teachers teach these subjects and therefore not taught by the regular elementary school etcher.

In reviewing the tables and statements, we can quality the comments by stating most of the elementary school teacher5s surveyed really did like teaching the various school subjects. They leaned more toward LIKE that DISLIKE on all of them with the exception of music and physical education.

RECOMMENDATIONS

Based on the data, the following recommendations are made:

1. Future studies should be conducted to determine why certain elementary school subjects are liked or disliked.
2. Pre-service and in-service workshops should be conducted to help teachers recognize and overcome any negative attitudes toward various subjects.

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Table 1

Demographic Data

Category	Frequency	Percentage
Gender		
Male	19	15
Female	105	85
Total	124	100
Grade Level		
First	22	18
Second	25	20
Third	22	18
Fourth	19	15
Fifth	24	19
Sixth	12	10
Total	124	100
Teaching Experience		
1-5 years	12	10
6-10 years	16	13
11-15 years	20	16
16-20 years	26	21
21-15 years	17	14
26-30 years	19	15
31-35 years	6	5
36-40 years	7	6
> 40 years	1	1
Total	124	101*

*Due to rounding total percent may not equal 100

Table 2

Typical School Subjects in Rank Order
by Teacher Preference

Subject	N	Mean	Std. Deviation
Mathematics	124	2.83	.54
Reading	124	2.81	.54
Spelling	124	2.54	.78
Science	124	2.48	.86
Social Studies	124	2.48	.88
Creative Writing	124	2.33	.87
Oral Expression	124	2.28	.98
Art	124	2.24	1.00
Health	124	2.23	.96
Listening	124	2.21	1.01
Handwriting	124	2.09	.92
Music	124	1.45	1.02
Physical Education	124	1.41	1.07

Note: Scale indicates 1=Neither Like Nor Dislike, 2=Dislike, 3=Like

Table 3

Favorite Subject Taught

Subject	Frequency	Percentage
Math	48	39
Reading	26	21
Science	19	15
Social Studies	16	13
English	6	5
Misc.	5	4
Creative Writing	2	2
Art	2	2
Total	124	101*

*Due to rounding total percent may not equal 100

Table 4

Least Favorite Subject Taught

Subject	Frequency	Percentage
Science	25	20
Creative Writing	19	15
Handwriting	15	12
Music	10	8
Physical Education	9	7
Spelling	7	6
Social Studies	7	6
Art	7	6
English	6	5
Mathematics	6	5
Reading	5	4
None	4	3
Life Skills	2	2
Health	2	2
Total	124	101*

*Due to rounding total percent may not equal 100

A REVIEW OF ATTRIBUTION STUDIES OF CHILDREN WITH LEARNING DISABILITIES (1977-1993)

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INTRODUCTION

Students with learning problems have been characterized as "learned helpless" (Thomas, 1979). They tend to view them-selves as failures and as dependent upon others for any successes they might have. Typically, students who have this view do not make use of the talents and abilities they do have; thus, when they have an assignment appropriate for their needs and bail-ties, they may fail to try very hard (Licit, 1983). The learned helpless students have been found to give up and make attributions for failures more quickly than students who were not considered learned helpless. While other students were still involved with the task and were still seeking solutions, learned helpless students had stopped trying (Diner & Deck, 1978). The attributions of a student with learning disabilities (LD) have direct implications for classroom teachers when teaching methods and curriculum modifications can be adjusted as needed.

According to Mercer (1992), attribution "refers to a person's beliefs concerning the causes of events" (p. 623). Attributions influence a person's motivation to perform a task. Weiner (1979) believed that attributions influenced a person's self-esteem, expectations for future events, and the acceptance of responsibility for the outcomes of the events. Further, motivation may increase the students' effort and abilities on school assignments (Dweck, 1986) and thus, increase their task persistence. The literature suggests there is an interaction between attributions, motivation, and self-concept (Bender & Wall, 1994).

Various research methods have been used to measure student attributions. Vispoel & Austin (1995) described three basic types of methods: the situational, the disposition, and the critical incident. In the dispositional method, the students reported their attributions for several hypothetical situations. In the situational method, children rated their own attributions for an experimental laboratory task, or rated the attributions for a hypothetical situation for another person. In the critical incident method, the students rated their attributions for a real life task or on a recalled real-life task.

PURPOSE OF THE STUDY

This review examined the findings of research studies comparing attributions of students with and without learning disabilities. They were conducted from 1977 to 1993.

THE METHOD

Selected studies were categorized according to the attribution findings. The findings were divided into groups according to the degree of specificity for attributions. The groups included attribution outcomes of students with disabilities and students without disabilities; attribution of success and failure of students with and without disabilities; and specific attribution (ability, effort, luck, and task difficulty) for students with and without disabilities.

FINDINGS

During this time period, research on attribution theory with students with LD primarily focused on "locus of control" differences between children with LD and children without disabilities. The results of these studies yielded a measure of internal or external attributions. Eight studies concluded that students with LD attributed outcomes differently from students without disabilities. They attributed outcomes more to external causes than students without disabilities (Engelberg & Evans, 1986; Fincham & Barling, 1978; Gardner, Warren, & Gardner, 1977; Grolnick & Ryan, 1990; Hallahan, Gajar, Cohen, & Tarver, 1978; Lewis & Patterson, 1989; Rogers & Saklofske, 1985; Tarnowski & Nay, 1989). In contrast, four studies found no differences in attributions for outcomes (Cooley & Ayres, 1988; Friedman & Medway, 1987; Hisama, 1976; Tollefson et al., 1982). Table 1 review studies of how students with and without learning disabilities differ in their attributions regarding academic achievement.

Four studies found students with LD attributed success more to external causes than internal causes (Chapman & Boersma, 1979; Lewis & Patterson, 1989; Pearl, Bryan, & Donahue, 1980; Rogers & Saklofske, 1985). When attributing outcomes for a successful experience, these students with LD were more likely to attribute success externally to task difficulty or luck. These students failed to take credit for having the ability or making the effort necessary for successful experiences. One study which used an open-ended interview for measuring attributions for success found no differences between students with LD and students without disabilities (Durrant, 1993).

When measuring specific attributions for success, researchers have noted differences between students with LD and students without disabilities. Students with LD were different in their perception of ability. They tended to view their ability as less important for success (Aponik & Dembo, 1983; Jacobson, Lowery & DuCette, 1986; Pearl, 1982). They also credited luck (Aponik & Dembo, 1983; Jacobson et al., 1986; Pearl et al., 1980; Pearl, 1982; Pearl, Bryan, & Herzog, 1983) and task difficulty (Pearl et al., 1980) as having greater impact on their success. The students with LD perceived factors outside of their control as influencing their successful outcome.

In contrast to the research supporting attributions of children with LD to external causes, Jacobsen et al. (1986) in Study #1 found no difference between normally achieving children and children with LD for attributing academic success to effort. However, in his second study, when the students were asked to rate the significance of ability, effort, task difficulty, and luck for the same event, the students with LD gave higher rankings to luck and task difficulty than did normally achieving children. These children with LD saw more causes contributing to their successful outcomes than normally achieving students. No studies indicated that luck and task difficulty attributions were the same. Two studies found no differences for ability attributions (Palmer, Drummond, Tollison & Zinkgraff, 1981; Pearl et al., 1980) and two studies found no differences for effort attributions (Pearl et al., 1980; Jacobson et al., 1986).

Three studies found no differences between students with LD and students without disabilities on attributions for failure (Chapman & Boersma, 1979; Lewis & Patterson, 1989; Pearl et al., 1980), and two studies found differences (Diener & Dweck, 1978, Rogers & Saklofske, 1985). When examining the specific attributions for failure, differences became more apparent. Students with LD attributed failure more to internal causes of lack of ability (Aponik & Dembo, 1983; Jacobsen et al., 1986; Kistner, Osborne, & LeVerrier, 1988; Licht, Kistner, Ozkaragoz, Shapiro & Clausen, 1985; Palmer et al., 1982; Pearl, 1982) and effort (Jacobson et al., 1986; Kistner et al., 1988; Pearl et al., 1980; Pearl, 1982) although Durrant (1993) found no differences. Also, differences in attributions for luck (Pearl, 1982; Pearl et al., 1983) and task difficulty (Jacobson et al., 1986; Pearl et al., 1980; Pearl et al., 1983) have been noted.

Some researches found gender differences regarding attributions. Licht et al., (1985) found that girls with LD attributed failure to lack of ability more than girls without LD; however, they were not different on measures of attributions for external factors. The same study found boys with LD attributed their failures to external factors more than boys without LD. The boys were no different in the manner in which they attributed failure to lack of ability. Ryckman & Peckham (1986) found that girls with LD attributed success more to effort and luck than did boys with LD. The girls also attributed failure more to ability than boys with LD.

The analysis of the literature did not reveal definitive findings regarding the attributions of outcomes for students with learning disabilities. There was some support of the concept of learned helplessness for students with learning disabilities (Diener & Dweck, 1978; Pearl, 1980; Pearl et al., 1983; Rogers & Saklofske, 1985). These researchers found that the students with LD credited their success to some ability and effort, as well as a significant portion due to task difficulty and luck. Other studies have not supported the notion of learned helplessness for students with learning disabilities (Durrant, 1993; Friedman & Medway, 1987; Jacobson et al., 1986). These studies found no difference between the attributions of students with learning disabilities and students without disabilities.

DISCUSSION

This study of the literature did not find conclusive evidence that students with learning disabilities consistently follow the learned helplessness pattern. It may be that LD is a very heterogeneous group concerning their attributions for success and failure. In addition, it could be that the attribution ratings do not occur consistently across various attribution measures.

The attribution beliefs of students who follow the learned helpless pattern may lead the students to failure in the classroom. When students accept little responsibility for their own successes, they will have little confidence in having success in the future. When they believe that success is due to luck or task difficulty, they are apt to gain little self-confidence in their own abilities and effort. Also, the students with LD who view failure as primarily due to their lack of ability may find this has a debilitating effect on their self-concept. For the students who attribute failure to lack of ability, they are not likely to be persistent on academic tasks; whereas, if their attribution for failure is external (i.e. task difficulty or luck), they are more likely to be persistent (Licht et al., & Clausen, 1985). Classroom teachers need to be sensitive to the needs of the students who exhibit learned helplessness behaviors.

CONCLUSIONS AND RECOMMENDATIONS

This attribution literature is somewhat inconsistent in the findings. This could be due to the control groups used or the method of measuring attributions. More recent studies have focused on defining more carefully the comparison groups (Durrant, 1993; Grolnick & Ryan, 1990; Tarnowski & Nay, 1989; Wehmeyer, 1994) and measuring the differences in specific attributions for actual events (Vispoel & Austin, 1995). Further research could also look at the impact of classroom modifications and teaching methods on attributions.

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Attribution of Outcomes for Students With and Without Disabilities

Success				Failure			
Internal		External		Internal		External	
Different	No Different	Different	No Different	Different	No Different	Different	No Different
	Jacobson, Lowery & DuCette (1986) --Study #2	Jocobson, Lower & DuCette, (1986) --Study #2				Licht, Kistner, Ozkaragoz, Shapiro, & Clausen (1985) --for boys	Licht et al., (1985) --for girls
Ability		Luck		Lack of Ability		Luck	
Different	No Different	Different	No Different	Different	No Different	Different	No Different
Aponik & Dembo (1983) Jacobson, Lowery, & DuCette (1986) --Study #1 Pearl (1982)	Palmer, Drummond, Tollison, & Zinkgraff (1981) Pearl, Bryan, & Donahue (1980)	Pearl, Bryan & Donahue (1980) --Gr 1 & 2 Pearl (1982) Pearl, Bryan & Herzog (1983) --SwLD less on success Aponik & Dembo (1983) Jacobson, Lowery, & DuCette (1986) --Study #1		Palmer et al. (1981) Pearl (1982) Jacobson, Lowery, & DuCette (1986) Study #1 Aponik & Dembo (1983) Licht et al., (1985) --girls Kistner et al., (1988)	Licht et al., (1985) --boys Durrant (1993)	Pearl (1982) Pearl, Bryan, & Herzog (1983) --SwLDmore on failure	
Effort		Task Difficulty		Lack of Effort		Task Difficulty	
Different	No Different	Different	No Different	Different	No Different	Different	No Different
Jacobson, Lowery & Donahue (1986) --Study #2	Pearl, Bryan & Donahue (1980) Jacobson, Lowery & Donahue (1986) --Study #1	Pearl, Bryan & Donahue (1980) Jacobson, Lowery, & DuCette (1986)- --Study #1		Pearl, Bryan & Donahue (1980) Pearl (1982) Jacobson, Lowery & DuCette (1986) Study #1 Kistner et al., (1988)	Palmer (1981) Durrant (1993)	Pearl, Bryan & Donahue (1980) Pearl, Bryan & Herzog (1983) Jacobson, Lowery, & DuCette (1986) --Study #1	

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Table 1

Attribution of Outcomes of Students With Disabilities and Students Without Disabilities

Different	No Difference
Gardner, Waren & Gardner (1977) Hallahan et al., (1978) Fincham & Barling (1978) Engelberg & Evans (1986) Lewis & Patterson (1989) Rogers & Saklofske (1985) Tarnowski & Nay(1989) Grolnick & Ryan (1990)	Hisama (1979) Tollefson, Tracy, Johnsen, Buenning, Farmer, & Barke (1982) Friedman & Medway (1987) Cooley & Ayres (1988)

Attribution of Success and Failure of Students With and Without Disabilities

Success		**Failure**	
Different	**No Difference**	**Difference**	**No Difference**
Chapman & Boersma (1979) Pearl, Bryan & Donhue (1980) Rogers & Saklofske (1985) Lewis & Patterson (1989)	Durrant (1993)	Diener & Dweck (1978) Rogers & Saklofske(1985)	Chapman & Boersma (1979) Pearl, Bryan & Donhue (1980) Lewis & Patterson (1989)

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AN IN-DEPTH LOOK AT SOUTH DAKOTA'S SUCCESSFUL EARLY CHILDHOOD INCLUSION PROGRAMS

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INTRODUCTION

The South Dakota Early Childhood Inclusion Project is a collaborative effort between the South Dakota University Affiliated Program and the University of South Dakota School of Education which began in 1995 with funding from the South Dakota Office of Special Education. A major focus of the project is to provide support to school districts who are including young children with special needs into integrated settings. Including children with and without disabilities in collaborative programs has been shown to be effective in meeting the needs of young children (McLean & Hanline, 1990; Diamond, Hestenes, O'Connor, 1994; Wolery, Werts, & Holcombe, 1994). This article will present a brief description of the project and describe research that was completed as part of the project.

AN OVERVIEW OF THE EARLY CHILDHOOD INCLUSION SUPPORT PROJECT

The South Dakota Early Childhood Inclusion Project was designed to provide support for programs who were, or wished to begin, integrating children with special needs into their programs. This support takes on many forms, including technical assistance and access to resources. During the early stage of implementation, project staff compiled a networking list of individuals who would be willing to work with others who had questions or were seeking advice about inclusion. The project assembled a library of resources, which included books and videos for teachers and parents, as well as children's books, videos, toys and equipment. A list of all of these materials and the Networking List were compiled into a Resource Manual. The manual also contained a 50-page book-list of children's books on a wide range of disabilities and medical disorders that could be accessed statewide through the inter-library loan system in the state. The Resource Manuals were sent to every school district and special services cooperative around the state. The manual and brochures distributed about the project contained a toll-free number that allowed individuals to call to access resources available through the project.

One of the major purposes of the Project was to identify factors that supported successful inclusion. In order to accomplish this, project staff traveled to 10 school districts around the state that were successfully including children with disabilities. Staff interviewed parents, administrators, teachers, therapists, and Head Start personnel. In the interview, participants were asked to describe the challenges they faced, how they overcame these challenges, and the benefits they found from inclusion. Many of these interviews were videotaped and were then made into a video that could provide answers and direction to other districts.

The project then designed a course on inclusion, which they offered over satellite and was accessible at 66 different high schools sites across the state. Lectures for the course were done in PowerPoint slides, which were broadcast over the satellite network. Over 50 people registered for this course throughout the state.

Project staff then produced a CD-ROM, "Inclusion: Celebrating Children's Successes," containing clips from the video and the entire 15 week series of PowerPoint slide show presentations from the course. The CD also contained materials from the resource manual.

RESEARCH

The first step in the Project's research was distributing a survey to all districts in South Dakota to determine attitudes toward inclusion and to gather information on inclusive service delivery practices for the three to five year old children in the school districts. This survey, along with input from the project's advisory committee, helped to identify ten districts for more in-depth study. Project staff traveled to each of the ten districts and interviewed parents and personnel. Districts set up interviews with parents and personnel based on individual's roles in their inclusive programs. Each district's program was unique, so the personnel involved varied. Some districts collaborated with Head Start Programs, while other districts did not. The goal was to interview at least one parent, one administrator, one therapist, and one teacher at each district, but the numbers varied according to the district. Some scheduled interviews were also canceled because of other conflicts that arose. The remainder of this article will present the results of the responses from district administrators, teachers and therapists to questions regarding the barriers they faced as they tried to implement inclusion, as well as the suggestions and recommendations they had for other districts attempting inclusion.

RESEARCH DEMOGRAPHICS

Eighteen administrators were interviewed. These administrators included: five Principals, five Directors of Special Education, four Superintendents, two Head Start Directors, one Head Start Disability Coordinator, and one Assistant Director of an Educational Cooperative. Twenty-two teachers were interviewed for this research, including seven Kindergarten Teachers, eight Early Intervention Teachers, three Head Start Teachers, three Preschool Teachers, and one Primary (K/1) Teacher. Eight therapists were involved in the interviews, seven Speech/Language Pathologists and one Physical Therapist.

BARRIERS TO INCLUSION

Each person interviewed was asked to describe the barriers they had faced as they implemented inclusion. Barriers fell into two general categories: Attitude Barriers and Policy Barriers. The Policy Barriers fell into three subcategories: Program, Personnel and Funding, and Logistical Barriers.

When asked, "What barriers did you face as you tried to implement inclusion?", Attitude Barriers were mentioned by 12 of the 18 administrators, 12 of the 22 teachers and 4 of the 8 therapists. These barriers included: understanding the importance of inclusion; understanding the concept of inclusion itself; lack of commitment to inclusion; parental concerns; public relations concerns; and problems associated with personnel having to deal with change.

In the category of Policy Barriers, Program-Related Barriers were cited by 8 of the 18 administrators, 19 of the 22 teachers, and 6 of 8 the therapists. These barriers included: concerns over the curriculum being developmentally appropriate for the children; ensuring that the needs of all the children were met; lack of time to plan; scheduling; and the difficulty of combining two different programs into one.

In the category of Policy Barriers, Personnel Issues were brought up by 12 of the 18 administrators, 10 of the 22 teachers and 6 of the 8 therapists. These barriers included: a lack of trained staff; lack of support for staff; a high staff turnover rate; issues of pulling together as a team; sharing classrooms; and designating and sharing job responsibilities.

Another sub-category of Policy Barriers dealt with Funding and Logistics. These were reported barriers for 15 of the 18 administrators, 6 of the 22 teachers, and 3 of the 8 therapists. There were a number of funding and logistical barriers which included: cost; lack of space or a facility itself; transporting children to and from programs; food and mealtime concerns; making buildings and rooms handicapped accessible; having enough needed materials; and tuition concerns.

This research is similar to that done by Smith and Rose (1993) who found that the barriers most often faced by programs attempting to implement inclusion fell into the categories of Policy and Attitudinal Barriers.

SUGGESTIONS AND RECOMMENDATIONS FOR IMPLEMENTING INCLUSION

The personnel did have suggestions and recommendations for those who were trying to implement inclusion in their districts. The first recommendation was that all personnel work closely together as a team and develop strong communication, including working to develop a philosophy, team teaching, and flexibility. These suggestions were made by 13 of the 18 administrators, all of the teachers, and 7 of the 8 therapists.

Another suggestion that was strongly recommended was that the district needed to believe in Inclusion. All 18 administrators mentioned this, as did 17 of the 22 teachers and 5 of the 8 therapists. Specifically, they talked about the district seeing the benefits of Inclusion, keeping an open mind, and continuing to work on inclusion.

A third suggestion from the districts was that to successfully implement inclusion, districts needed to spend time planning the process. Planning was mentioned by 12 of the 18 administrators, 7 of the 22 teachers and 6 of the 8 therapists. When discussing planning, they spoke of issues such as having a long range plan, going slowly, identifying the population that would be served, visiting other programs to get ideas, and having plenty of planning time once inclusive practices were underway.

A fourth major area of suggestions and recommendations was the need for support and resources. This was voiced by half of all the administrators, teachers and therapists. They recommended that districts work with other agencies, combine their resources, and provide support staff for teachers. They also spoke of the need for administrative support, adequate funding and having appropriate facilities.

Another area of recommendations came in the need for training for staff and parents. Seven of the 18 administrators, 4 of the 22 teachers, and 3 of the 8 therapists echoed this, suggesting that both classes and inservice opportunities in inclusion would help.

CONCLUSION

The results of this research point out the need districts have for additional training and technical assistance. It also illustrates the need for models that districts can follow as they attempt to implement inclusion. Finally, there is a need for continued research in this area to strengthen our knowledge of factors that contribute to successful inclusion, allowing school districts to build on the successes of other programs.

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THE IMPACT OF PERINATAL INSULTS AND DISABILITIES ON YOUNG CHILDREN'S DEVELOPMENT FROM BIRTH TO EIGHT YEARS OF AGE: RESEARCH LINKED TO PRACTICE

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INTRODUCTION

Occasionally, conditions surrounding the birth of an infant interfere with the predictable organization of skills across modalities. These conditions may involve a stressful birth, geneticanomalies, or subtle and unsuspected characteristics that appear when major milestones are reached. As a result, the inaccurate or limited information the infant receives and/or the lack of exploratory experiences resulting from the misinterpretation of information may further compromise the infant's ability to organize and interpret experiences. When the organization of information is impeded in one or several modalities, it is possible that the skill network that the at-risk infant uses to structure the environment may proceed differently from that of the typical infant. Unfortunately, the impact of prenatal insult and disabilities at birth are rarely linked to a child's current developmental status. This is partially due to limited understanding of the long term impact and understanding of early difficulties.

The results of two studies including children from birth to 8 year of age are presented. These studies investigated whether events identified at birth which placed infants at-risk contributed to their later developmental difficulties.

Study 1: Impact of Birth Trauma on Task Performance

To investigate the relationship of an insult or handicapping condition from birth to infants' ability to organize and respond to stimuli received simultaneously from multiple sensory modalities, infants between the adjusted ages of 91 and 240 days were recruited from neonatal follow-up clinics. Behaviors were observed during three tasks that required integrating multiple stimuli, a) a task of spatial perception; b) a task of intermodal representation of speech; and c) a contingency learning task. Findings presented in Table 1 indicate that a) mechanically ventilated infants were more irritable than non-ventilated infants, b) infants from lower income families were fussier than infants from higher income families, c) lower birth weight infants were more successful on the visual task than higher birth weight infants, d) 5-minute Apgar scores were more predictive of infants' success than 1-minute scores on the visual task, e) older infants were more accurate during the reaching task than younger infants, f) there were more smiling responses from older infants, and g) older infants were more accurate during the reaching tasks. (Urquhart, 1993).

Table 1. Effects of Significant Predictor Variables

Variables Dependant	Independent	Significant
Fussing	Ventilation	.021
Fussing	Income	.042
Visual Perception	Birth Weight	.018
Visual Perception	Apgar B	.004
Reach	Adjusted Age	.018
Smiling	Adjusted Age	.035
Attention	Education	.036

Visual Perception

To explore the lasting effects of the birth trauma on infants' ability to organize information, follow-up information was gathered which included initial and subsequent scores from Bayley Scales of Infant Development (Bayley, 1969). This information was analyzed with the results from the initial study (i.e., performance on the tasks of spatial perception, intermodal representation of speech, and contingency learning).

Results presented in Table 2 indicate that a) infants whose mothers had more education performed better on the first Bayley Scales collected during the initial study, and b)Bayley Scores were correlated to infants' performance on the reaching tasks and the auditory/visual matching activity. Additional information from the study indicates that later Bayley scores and Stanford-Binet scores for those infants (n=5) who were located for long-term follow-up, were highly correlated. These scores were also positively correlated with mothers' income and educational levels.

(weight gain of more than 40 pounds and or excessive swelling) and, Intrauterine Stress (vaginal bleeding, medications, and gynecological surgery) may relate to later behavior problems in both children with and without learning disabilities.

Table 3. The Relationship Between Perinatal Factors and Later Behaviors as Rated by Parents and Teachers.

LD/ Non-LD	Obstetric		Gest Age		Psy/ Soc		Maternal Morph		Labor		Delivery		Mother Weight		Intrauterine		Toxic Stress		Fetal O^2	
Total Behaviors		.36																		
							-.42	.40	-.46				.54	.51		.41				
Interpersonal Problems		.45						.38												
								.30						.54		.37				
Physical Symptoms								.35								.45				
							-.36	.30				.34	.54	.43						
Depression																				
														.40						
Inappropriate Behaviors/ Feelings		.45														.33	.33			
							-.31		.35					.53		.37			.35	

Parent = shaded
Teacher = non-shaded

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Although data from this research do not establish a causal relationship between birth events and later competence in young children, the findings suggest that birth events and environmental factors may contribute to a child's later performance. Future research should continue to evaluate the impact that insults early in development have on children's long term development to provide parents and practitioners with more information when evaluating and planning appropriate intervention strategies.

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INCREASING GEOMETRIC CONTENT KNOWLEDGE: COMPUTER-BASED INSTRUCTION JOURNAL WRITING

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INTRODUCTION

The present high school geometry course is not effective for most students. Many students fail high school geometry because of the lack of entry-level knowledge (Senk, 1989; Usiskin, 1982). The difficulties that students have with high school geometry appear to begin in earlier grades. Research findings (Burger, 1985; Fuys, Geddes, & Tischler, 1988; Usiskin, 1982) show that geometry is a neglected part of the middle school mathematics experience of many students. These findings indicate that what geometry is taught at the middle school level is often taught by rote or requires minimal student response and teacher feedback.

The weaknesses in instruction are likely to be related to the teachers' own experiences with mathematics. Mayberry (1983) found that many pre-service elementary teachers (70%), who had taken a high school geometry class, were at or below van Hiele Level 2 (informal deduction). Pre-service elementary teachers who did not take a high school geometry class were at or below van Hiele Level 1 (recognize and name properties of geometric figures). Geometric content knowledge has an effect on instruction. Parsons (1994) found that pre-service elementary teachers' instruction was at their measured van Hiele level. That is, if a pre-service elementary teacher is measured to be at van Hiele Level 0 (recognition of shapes), then instruction will only be at van Hiele Level O.

The use of a LOGO program has been found to produce positive results in K-8 students' learning of geometric content (Thomas & Thomas, 1984). Yusef (1991) found that by using a LOGO program and LOGO-based Instruction, seventh and eighth grade students were able to raise their van Hiele levels by as much as two van Hiele levels. Other research conducted on the effects of using a LOGO program has been directed toward inservice teachers and their implementation of LOGO programming into their elementary classrooms (Moreira & Noss, 1995). Parsons (1996) showed that the use of a LOGO program and LOGO-based instruction could increase geometric content knowledge of pre-service elementary teachers.

The purpose of this paper is to report the research that was conducted using the van Hiele Model at the University of South Dakota during 1998. Researchers at the University of South Dakota were involved in two projects: (1) a study to determine if computer-based instruction would raise the van Hiele levels of eighth grade students, and (2) a study to determine if journal writing would raise the van Hiele levels of pre-service elementary teachers in a concept mathematics course.

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Achievement in Geometric Understanding by Eighth Grade Students

INTRODUCTION

Learning geometry can be difficult for most geometry students (Battista & Clements, 1995; Fuys, 1985; Fuys, Geddes, & Tischler, 1988; Markel, 1994; Mullis, Dossey, Owen, & Phillips, 1991; Senk, 1989; Usiskin, 1982; van Hiele, 1986). Studies have shown that students need experience in thinking at different levels of geometric understanding (Fuys, Geddes, & Tischler, 1988; Shaughnessy & Burger, 1985; Usiskin, 1982; van Hiele, 1986). The van Hiele model of thinking in geometry provides strategies and suggested activities for helping students move from one van Hiele level to the next van Hiele level (Fuys, Geddes, & Tischler, 1988; Shaughnessy & Burger, 1985; van Hiele, 1986). This study used Windows TM Geometry as the geometry computer-based guided instruction application. Windows TM Geometry is composed of on-line self-help tutorials to guide the geometry student through over 55 subject areas using over 700 practice problems.

Description of Study (8th Grade Students)

To check the efficacy of the software application (*Windows TM Geometry*), the researcher gave a demonstration of Windows TM Geometry at a joint science and math teachers' conference in February 1997 (Breen, 1997). Encouraged by the reception that the demonstration received at the conference, the researcher then scheduled a pilot study in August 1997. The purpose of the pilot study was to determine whether eighth grade students could use the application software (Windows TM Geometry) in an instructional setting. The pilot study showed that eighth grade students could use Windows TM Geometry with minimal training and could advance to the next higher van Hiele level of geometric thought.

The primary purpose of this study was to investigate the effect that a geometry computer-based guided instruction application (Windows TM Geometry) had on (a) an eighth grade student's understanding of standard geometric concepts, and (c) an eighth grade student's understanding of certain geometric definitions. Specifically, this study was concerned with the question: can eighth grade students achieve van Hiele Level 2 (Informal Deduction) through the use of geometry computer-based guided instruction (*Windows TM Geometry*)?

METHODOLOGY AND RESULTS (8th Grade Students)

In December 1997 eleven students from the middle school, located in a college town in South Dakota, took the Van Hiele Geometry Test prior to and after instruction with the geometry computer-based, guided instruction application (*Windows TM Geometry*). The five-week study was conducted at a state university located in the southeast area of South Dakota. The study was divided into three phases.

The first phase of the study was the pretest that was conducted on November 19th, 1997 and November 20th, 1997. All the participants in the study completed the Van Hiele Geometry Test, the Entering Geometry Test, and the Geometry Vocabulary Test in slightly more than one hour.

The second phase of the study comprised of three treatment sessions. The actual activities used in the study were compared against activities, lessons, and exercises contained in the textbook developed by Serra (1989). Discovering Geometry (Serra, 1989), reflects the research on the van Hiele model for geometric thinking by its author, Michael Serra. *Discovering Geometry* (Serra, 1989) guides students to discover and master concepts and relationships before they are introduced to formal proofs.

The last phase of the study was conducted on December 17th, 1997.

Van Hiele Geometry Test Results

The criterion of three out of five correct answers on each van Hiele level was used to assign the student's van Hiele level (Senk, 1989, Usiskin, 1982). Students who did not meet the qualifications required for van Hiele Level 0 (Visualizations) were assigned to a Below Level 0 category. Table 1 shows the students' van Hiele levels from the pretest and posttest portions of the study. As shown in Table 1, two students (18.18%) entered the treatment portion of the study at a van Hiele level less than Van Hiele Level 0 (visualization), five students (45.45%) were at Van Hiele Level 0 (Visualization), and four students (36.36% were at Van Hiele Level 1 (Analysis). No eighth grade student had met the van Hiele level criterion beyond Van Hiele Level 1 (Analysis).

The one-tailed "t" test ($t=11.701$, $df=10$;$p<0.001$) for nondependent samples was used to determine whether there was a significant difference between the results of the pre-test and post-test. The hypothesis that there was no difference in the students; van Hiele levels after exposure to geometry computer-based guided instruction was rejected. The inference of this test is that the treatment (*Windows TM Geometry*) did make a difference in the eighth grade students' level of geometric understanding as measured by the Van Hiele Geometry Test.

A simple Z test ($Z = 2.543$; $p= .0055$; $a= .05$) was used to check the proportions between the pre-test and post-test at Van Hiele level 2 (Informal Deduction). The hypothesis that the proportions were equal was rejected. The inference of this test is that eighth grade students can achieve Van Hiele Level 2 (Informal Deduction) after instruction with a geometry computer-based guided instruction (*Windows TM Geometry*).

Entering Geometry Test Results

Achievement on standard geometry content (not including proofs) was measured in the pretest and posttest portions of the study by the Entering Geometry Test. The two-tailed t test ($t= 1.39458$, $df= 10$; $p<0.05$), adjusted for non-independent means, indicated that there was no significant difference in the students' scores between the pretest and posttest results. The inference from this statistical test was that the eighth grade students' understanding of basic geometric concepts were not affected by the geometry computer-based guided instruction (Windows TM Geometry).

Geometry Vocabulary Test Results

The van Hiele model (van Hiele, 1986) indicates that two persons reasoning at different levels of geometric understanding may not understand each other. The van Hiele model further states that each van Hiele level of geometric thinking has its own vocabulary and geometric symbols (van Hiele, 1986).

The Geometry Vocabulary Test was administered in the pretest and posttest portions of the study to determine if the eighth grade student's use of geometry computer-based guided instruction (Windows TM Geometry) had any affect upon the student's understanding of standard geometric terms. The two-tailed t test (t= -0.39606, df= 10; p<.05), adjusted for non-independent samples, confirmed that there was no significant difference in the scores from the Geometry Vocabulary Test between the pretest and posttest portions of the study. The inference from this statistical test is that the geometry computer-based guided instruction (Windows TM Geometry) had no affect upon the eighth grade students' definitions of geometric terms.

IMPLICATIONS AND DISCUSSION (8TH GRADE STUDENTS)

The study did demonstrate the effectiveness of geometry computer-based guided instruction (Windows TM Geometry) when used as a geometry tutor in the classroom. The treatment did help the eighth grade students progress through the instructional phases associated with geometric understanding. The treatment did help the eighth grade students achieve van Hiele Level 2 (Informal Deduction) in geometric thinking. The fact that the computer-based guided instruction (Windows TM Geometry) was inexpensive to purchase (less than $15) and required minimal instruction in its use are two features which should encourage the use of such software in the classroom.

Analysis of the Entering Geometry Test results (see table 1) showed no difference in the students' understanding of basic geometric concepts after treatment with van Hiele phase-based activities. This result did not differ from other studies in the learning of geometric concepts using computer-based guided instruction and van Hiele phase-based activities (Bobango, 1989; Thompson, 1993).

Analysis of the Geometry Vocabulary Test results (see Table 1) showed no difference in the eighth grade students' scores taken before and after treatment with the computer-based guided instruction (Windows TM Geometry). This result was unexpected by the researcher. Van Hiele (1986) had warned of the tendency of geometric learning to degenerate into rote memorization of the geometric concepts by the students. The researcher observed this facet of student behavior. Several students mentioned to the researcher after completing the posttest series of examinations that they knew that they had gotten some answers wrong because they couldn't remember the answers. Analysis of the Van Hiele Geometry Test results and the Geometry Vocabulary Test results showed that some students had incorrectly answered questions I the posttest that they had answered correctly in the pretest. During the pretest series of examinations, the students had not been formally exposed to the geometric concepts being introduced with the treatment. In answering the pretest questions the students analyzed the questions and constructed their own answers. In answering the same questions in the posttest portion of the study, some students depended upon memorization instead of analysis

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INTRODUCTION

Results from research (Borasi & Rose, 1989; Mett, 1987; Miller, 1992; Nahrgang & Petersen, 1986) suggested that journal writing will enhance students' mathematical understanding in specific areas such as algebra and calculus. The idea of writing to improve understanding in various content courses is widely publicized. Farrell (1978), Lehr (1980), and Stock (1985) mentioned the idea of writing across the curriculum. The Curriculum and Evaluation Standards for School Mathematics (NCTM, 1989) and the Professional Standards for Teaching Mathematics (1991) supported the use of writing as an instructional technique to improve student and teacher discourse in mathematics.

DESCRIPTION OF STUDY

This study explored the influence of journal writing on the geometric understanding of pre-service elementary education teachers in a classroom setting. This study also explored the influence of journal writing on the proof-writing abilities of pre-service elementary teachers.
The study addressed the following research questions.

1. To what extent does journal writing affect the geometric understanding of an experimental group of pre-service elementary teachers?
2. To what extent does journal writing affect an experimental group of pre-service elementary teachers with no previous collegiate instruction in van Hiele Geometry in showing progress in moving from one van Hiele Level to the next?
3. To what extent does journal writing affect an experimental group of pre-service elementary teachers in using proof writing to increase their geometric understanding?
4. To what extent does journal writing affect an experimental group of pre-service elementary teachers in using journal writing to increase their proof-writing ability?
5. To what extent does journal writing affect an experimental group of pre-service elementary teachers in their ability to verbalize their geometric understanding in an interview containing activities based on the van Hiele Levels?

METHODOLOGY AND RESULTS

Pre-service elementary teachers were randomly divided into two groups, control and experimental. All participants were given a questionnaire which assessed the student's age, gender, year in college, mathematics courses completed at the high school and college levels, and other related questions pertaining to the students' perceptions about the teaching and learning of mathematics. All participants were then given a pretest consisting of the van Hiele Geometry Test and the Geometry Proof Test (Usiskin, 1982). Both groups received two sets of instruction on van Hiele Levels 0-3. The experimental group also completed journals consisting of questions pertaining to the respective van Hiele Level. Upon the completion of the lessons, a posttest was administered to each participant consisting of the same van Hiele Geometry Test and Geometry Proof Test (Usiskin, 1982). Each participant was then given an interview to determine whether they could verbalize at the same van Hiele Level as they tested.

The method of data analysis that was presented and discussed in Measures of Problem-Solving Performance and Problem-Solving Instruction (Schoenfeld, 1982) was used to assess the proof-writing skills. A one-tailed t-test involving paired differences of dependent samples was used to determine any significant differences (at the .05 level) in the control group as compared to the experimental group in terms of van Hiele Levels and within each of the five van Hiele Levels.

The results from the proof-writing test showed similar conclusions for the control group and the experimental group. Only one proof was completely solved by one participant. The results obtained from the Geometry Proof Test is consistent with prior research conducted by Mayberry (1983) and Senk (1989) in that students who have had high school geometry cannot write proofs.

The results from the van Hiele Geometry Test indicated that there was a difference in the van Hiele Levels from the pretest to the posttest in the experimental group. The data suggests that journal writing improved the van Hiele Level in an experimental group of pre-service elementary teachers. Other results obtained from the van Hiele Geometry Test indicated that there was a trend toward significance in the experimental group in the number of correct responses from the pretest to the posttest for van Hiele Level 1 (Analysis) and van Hiele Level 4 (Rigor).

The results from the interview indicated that the participants might have had some preconceived notions about geometry prior to the beginning of the study. Participants perceived the study of proofs as "a good refresher" and that they "still did not like the proofs".

IMPLICATIONS AND DISCUSSIONS

The implications of this study are that further research must be conducted to determine if interactive learning may have been a contributing factor to the significance in van Hiele Levels. Further research needs to be conducted to determine the effects of journal writing on a group of student who have never had any instruction in geometry. The preconceived notions about geometry may have had an effect on the results of the Geometry Proof Test. Also, the inclusion of a question in the interview pertaining specifically to the effects of journal writing on the geometric understanding of the participants in the experimental group should be incorporated. Further research is necessary so that this study may be duplicated with an increased number of participants in the control and experimental groups.

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